LOCALLY RUN WEB BASED APP FOR INTERPRETABLE BREAST CANCER DIAGNOSIS FROM HISTOLOGY IMAGES

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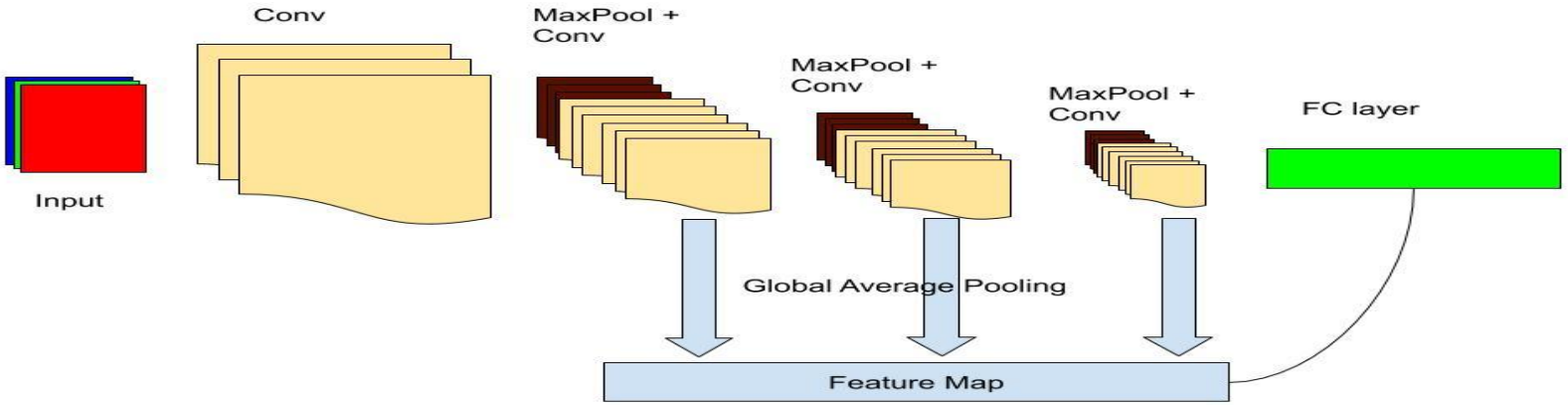
Aims and Objective.

- Develop a Deep Neural Network (DNN) architecture for classifying Breast cancer diagnosis from histology images
- Integrate at least two interpretability model for interpreting DNN decision
- Make the code deployable on a localhost web application.

Dataset description

- We made use of the high resolution H&E breast histology data from the Breast Cancer Histology Challenge (BACH) 2018 repository.
- The dataset consists of 400 images split evenly between four categories; (i) normal (ii) benign, (iii) insitu carcinoma and (iv) invasive carcinoma.
- Each image in the dataset is of RGB color channel with size of 2048 x 1536 pixels.
- Preprocessing:
  - Stain normalization and resize the image to (512 x 512) using bilinear interpolation.
  - We did not extract patches as commonly used in different literature.

Architecture



Current Status and result

- ❏ Implemented and integrated the final architecture (as shown in figure previously) for multi-class classification.
- ❏ Implemented **GradCAM** method for interpretability.

Challenges

- Dataset is limiting in number of samples for a multi-class problem
- Validation accuracy still low but work is in progress to improve it.
- Due to low accuracy, cannot implement the Out of Distribution detection part of the proposal. (OoD)

Next steps

- ➔ Improving the performance of the architecture and model
- ➔ Implementing other Interpretability methods
- ➔ Building the project demo website where end users can test with.
- ➔ Make code reproducible and open source it
- ➔ Write the technical paper for the work.